MPM 2D

SOLVING QUADRATIC EQUATIONS BY FACTORING

ZERO PRODUCT PROPERTY: If $ab = 0$, then $a = 0$ or $b = 0$.

→ ... finding the zeros of a quadratic relation.

Separate the factors, set each factor equal to zero and solve for x.

TOP 4 FACTORING TECHNIQUES:

① COMMON FACTOR

Eg. Solve $4x^2 - 6x = 0$

$2x(2x - 3) = 0$

$2x = 0$ or $2x - 3 = 0$

$2x = 3$

$x = 0$ $x = \frac{3}{2}$

Eg. $18x^2 = 12x$

$18x^2 - 12x = 0$

$6x(3x - 2) = 0$

$6x = 0$ or $(3x - 2) = 0$

$x = 0$ or $x = \frac{2}{3}$

② SIMPLE TRINOMIAL

Eg. $n^2 = n + 6$

$n^2 - n - 6 = 0$

$(n - 3)(n + 2) = 0$

$n - 3 = 0$ or $n + 2 = 0$

$n = 3$ or $n = -2$

Eg. $(k + 4)(k - 2) = 16$

$k^2 - 2k + 4k - 8 - 16 = 0$

$k^2 + 2k - 24 = 0$

$(k + 6)(k - 4) = 0$

$k + 6 = 0$ or $k - 4 = 0$

$k = -6$ or $k = 4$

③ DIFFERENCE OF SQUARES

Eg. $9w^2 = 4$

$9w^2 - 4 = 0$

$(3w - 2)(3w + 2) = 0$

$3w - 2 = 0$ or $3w + 2 = 0$

$w = \frac{2}{3}$ or $w = -\frac{2}{3}$

Eg. $1 = 25n^2$

$0 = 25n^2 - 1$

$0 = (5n - 1)(5n + 1)$

$5n - 1 = 0$ or $5n + 1 = 0$

$n = \frac{1}{5}$ or $n = -\frac{1}{5}$

④ "TRICKY" (COMPLEX) TRINOMIALS

Eg. $5y^2 - 2y = 16$

$5y^2 - 2y - 16 = 0$
$5y^2 - 10y + 8y - 16 = 0$
$5y(y - 2) + 8(y - 2) = 0$
$(y - 2)(5y + 8) = 0$
$y - 2 = 0$ or $5y + 8 = 0$

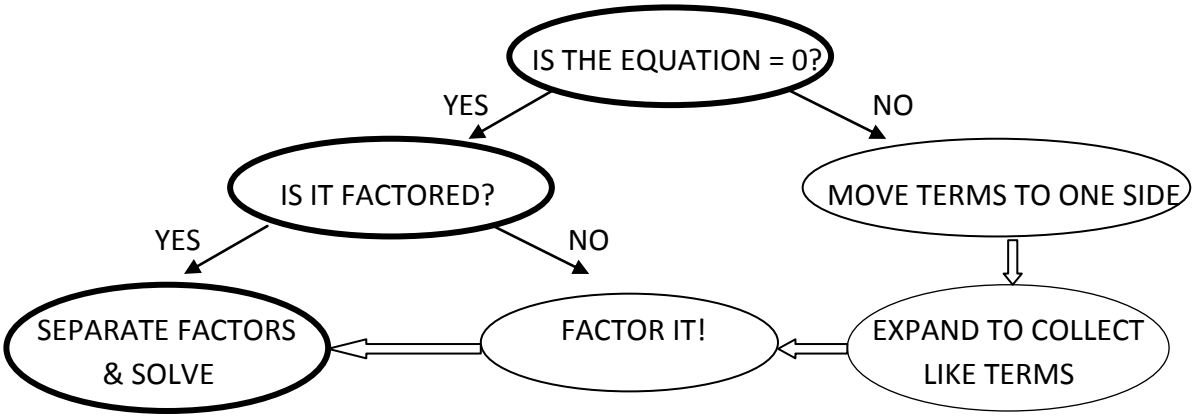
$y = 2$ or $y = -\frac{8}{5}$

Eg. $(3x + 2)^2 = -3x$

$9x^2 + 6x + 6x + 4 + 3x = 0$
$9x^2 + 15x + 4 = 0$
$9x^2 + 3x + 12x + 4 = 0$
$3x(3x + 1) + 4(3x + 1) = 0$
$(3x + 1)(3x + 4) = 0$
$3x + 1 = 0$ or $3x + 4 = 0$

$x = -\frac{1}{3}$ or $x = -\frac{3}{4}$

QUESTIONS TO ASK WHEN SOLVING QUADRATIC EQUATIONS:



EXERCISE: Solve each quadratic equation by factoring.

1. $3x(x - 2) = 0$
2. $(5w + 2)(2w - 1) = 0$
3. $4x^2 = x$
4. $n(n + 4) = 21$
5. $(n + 2)(4n - 3) = 3$
6. $121 = 9x^2$
7. $81d^2 = 1$
8. $(3p - 1)(2p - 3) = -2$
9. $x(x - 8) = 20$